



M65831

Echo Processor for Microphones in Karaoke Systems

Product Specification

Specification Revision History :

Version	Date	Description
2010-01-A1	2010-01	Update the template
2012-01-B1	2012-01	Add specification revision history
2018-09-B2	2018-09	Update the template; add ordering information; update the application diagram
2019-04-B3	2019-04	Update the template
2022-01-B4	2022-01	Modify ordering information
2026-03-B5	2026-03	Modify ordering information, soldering temperature and package information



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1、General Description

The M65831 is an IC developed for producing echo effects added to voice signals picked up by microphone for karaoke applications.

The IC has the largest memory among the digital delay series. As it's design is aimed at high performance, it is best suited to provide radio cassette tape recorders and miniature unit audio system with quality echo function.

Features:

- Built-in input / output filters, A-D and D-A converters, and memory realize a delay system with only a single chip
- Capable of composing low-noise and low-distortion delay system at low cost by ADM system (No=-92dB typ, THD=0.5% typ)
- Control mode selections available from 2 kinds: easy mode using parallel data and microcomputer mode using serial data
- Sleep mode can be selected to stop IC functions
- Built-in automatic reset circuit
- Package form: SOP24

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
M65831F	SOP24	M65831F	30 PCS/tube	80 tube/box	2400 PCS/box	Dimensions of plastic enclosure: 15.4mm×7.5mm Pin spacing: 1.27mm

Reel packing specifications:

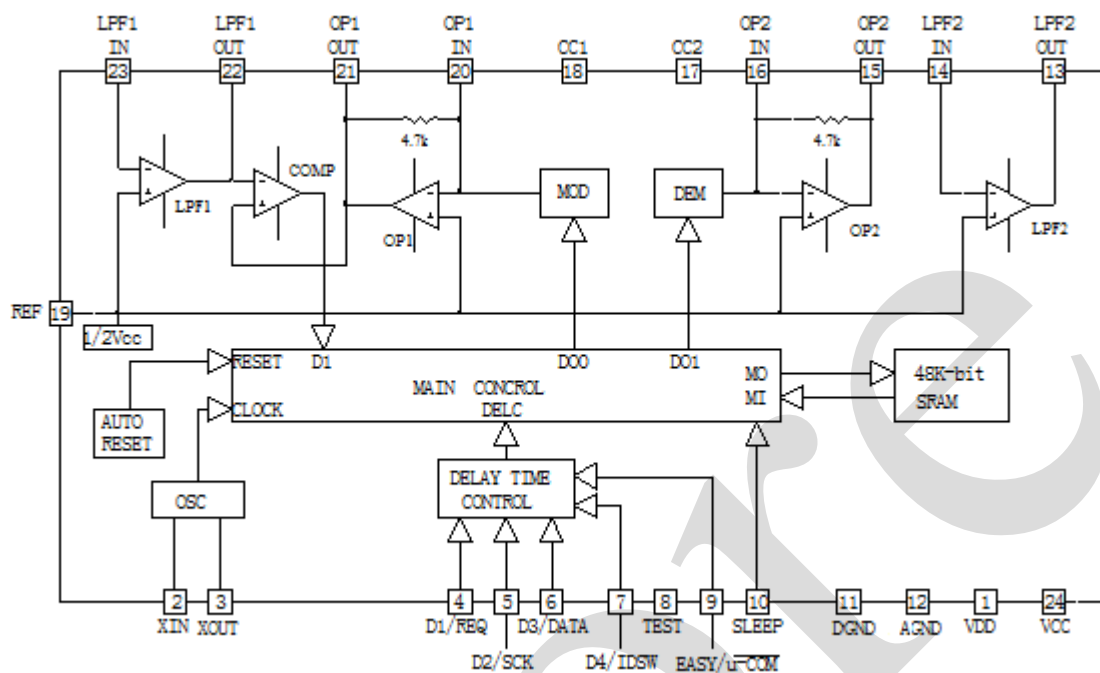
Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
M65831F	SOP24	M65831F	1250 PCS/reel	1250 PCS/box	Dimensions of plastic enclosure: 15.4mm×7.5mm Pin spacing:1.27mm

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.

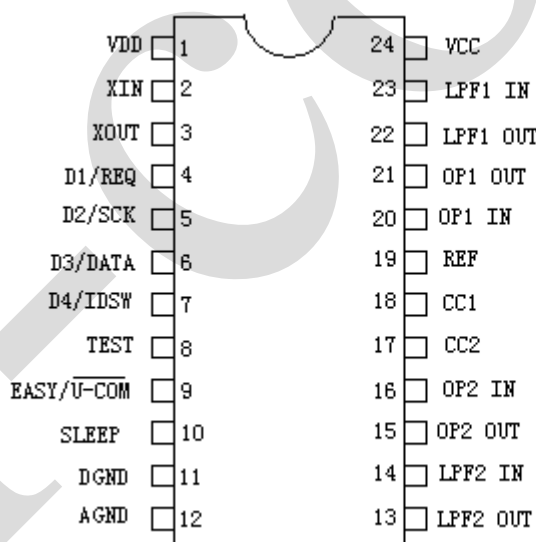


2、Block Diagram And Pin Description

2.1、Block Diagram



2.2、Pin Configurations





2.3、Pin Description

No.	Symbol	Name	I/O	Function
1	VDD	Digital VDD	-	Supply voltage
2	XIN	Oscillator input	I	-
3	XOUT	Oscillator output	O	Connects to 2MHz ceramic filter
4	D1/REQ	Delay1/Request	I	Easy mode: inputs D1 data μ -COM mode: inputs request data
5	D2/SCK	Delay2/Shift clock	I	Easy mode: inputs D2 data μ -COM mode: inputs shift clock
6	D3/DATA	Delay3/Serial data	I	Easy mode: inputs D3 data μ -COM mode: inputs serial data
7	D4/IDSW	Delay4/ID switch	I	Easy mode: inputs D4 data μ -COM mode: controls ID code
8	TEST	Test	I	L=normal mode
9	$\overline{\text{EASY}/u - \text{COM}}$	$\overline{\text{EASY}/u - \text{COM}}$	I	H=easy mode L= μ -COM mode
10	SLEEP	Sleep	I	H=sleep mode L=normal mode
11	DGND	Digital GND	-	Connects to analog GND at one point
12	AGND	Analog GND	-	Connects to analog GND
13	LPF2 OUT	Low pass filter2 output	O	Forms low pass filter with external C.R
14	LPF2 IN	Low pass filter2 input	I	
15	OP2 OUT	OP-AMP2 output	O	Forms integrator with external C.R
16	OP2 IN	OP-AMP2 input	I	
17	CC2	Current control 2	-	-
18	CC1	Current control 1	-	-
19	REF	Reference	-	=1/2VCC
20	OP1 IN	OP-AMP1 input	I	Forms integrator with external C.R
21	OP1 OUT	OP-AMP1 output	O	
22	LPF1 OUT	Low pass filter1 output	O	Forms low pass filter with external C.R
23	LPF1 IN	Low pass filter1 input	I	
24	VCC	Analog VCC	-	Supply voltage



2.4、Function Description

Working State

1) DELAY TIME

D4	D3	D2	D1	fs	Td
L	L	L	L	500	12.3
			H		24.6
		H	L		36.9
			H		49.2
	H	L	L		61.4
			H		73.7
		H	L		86.0
			H		98.3
H	L	L	L	250	110.6
			H		122.9
		H	L		135.2
			H		147.5
	H	L	L		159.7
			H		172.0
		H	L		184.3
			H		196.6

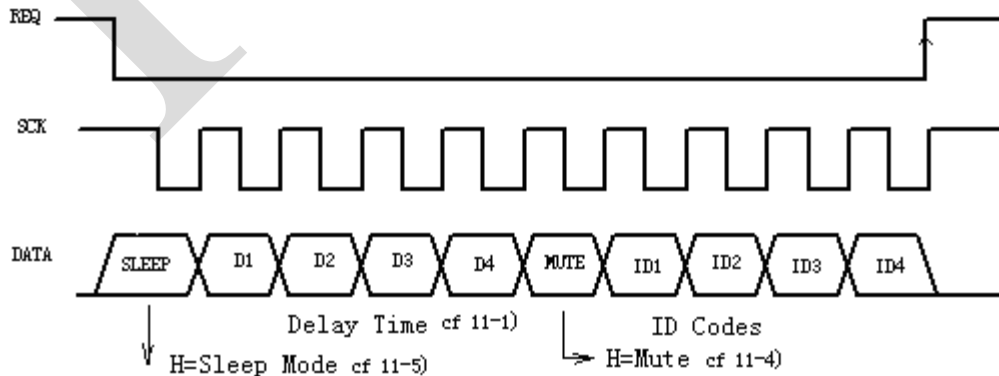
fs=sampling frequency(kHz) Td=delay time(ms)

2) EASY MODE (EASY/ $\overline{uCOM}$ =H)

D1, D2, D3, D4 and sleep are for easy mode



3) μ -COM MODE (EASY/ $\overline{uCOM}$ =L)



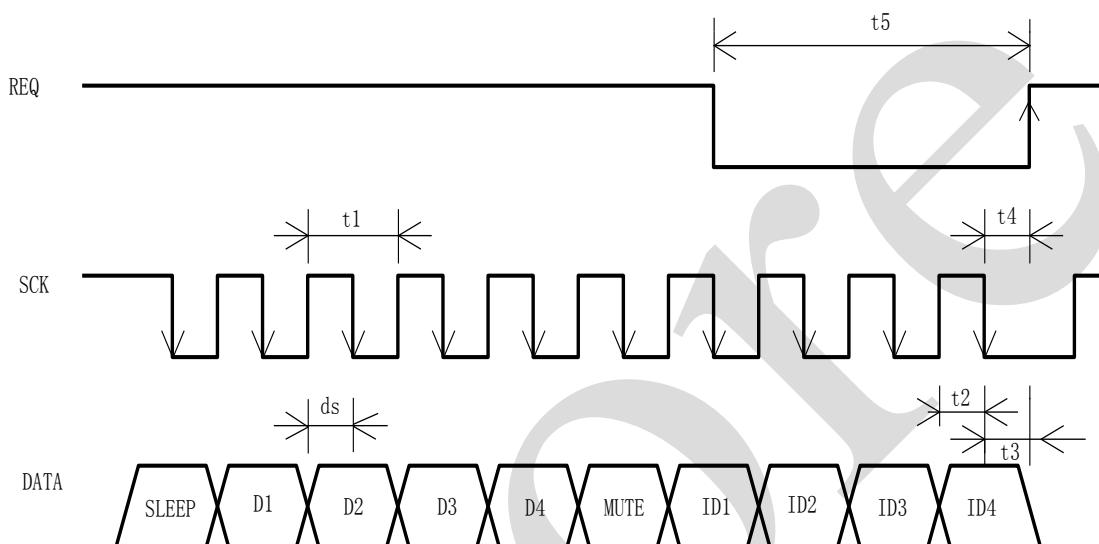


This Timing chart shows that delay time is set by serial data from μ -COM.

DATA signal is latched at the falling edge of SCK signal, the last ten data are set at the rising edge of REQ signal when ID codes are satisfied.*

$$* \begin{cases} \text{ID1, ID3: L} \\ \text{ID2} & : \text{H} \\ \text{ID4} & := \text{IDSW} \end{cases}$$

REQ, SCK, DATA Input Timing



Parameter	Symbol	Min.	Typ.	Max.	Unit
SCK pulse width	t_1	250	-	-	ns
SCK pulse duty	ds	-	50	-	%
DATA setup time	t_2	100	$t_1/2$	-	ns
DATA hold time	t_3	100	$t_1/2$	-	ns
REQ hold time	t_4	100	-	-	ns
REQ pulse width	t_5	250	-	-	ns

4) MUTING

(1) Easy mode

Automatic mute upon changing delay time, canceling SLEEP mode and power-on.

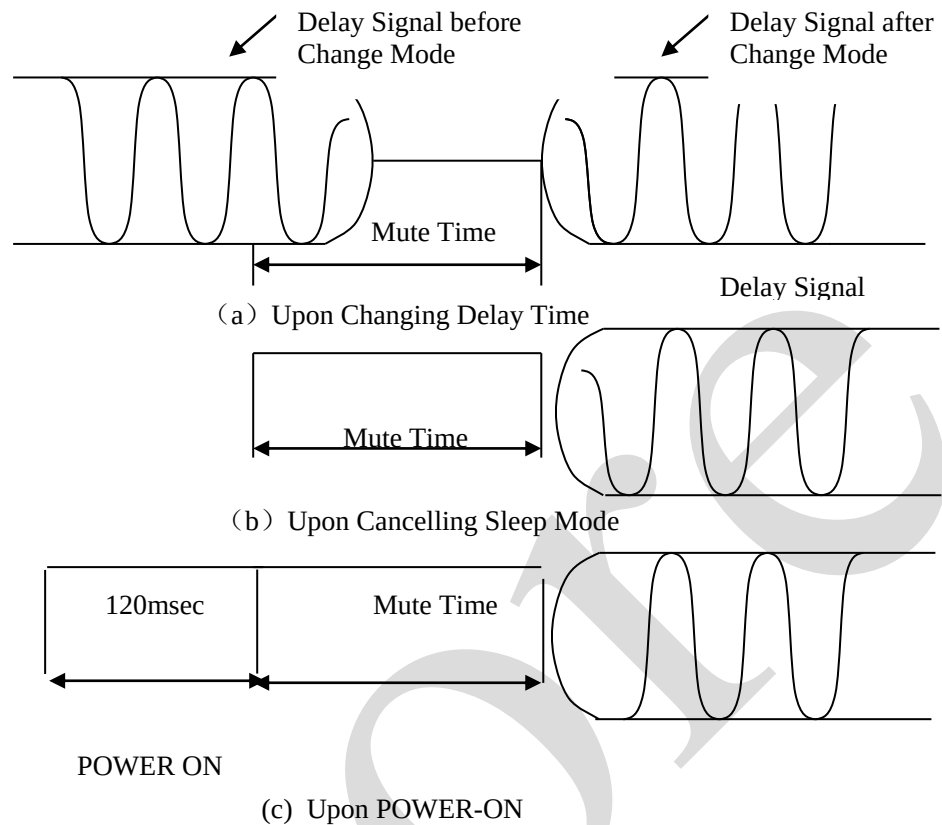
(2) μ -COM mode

MUTE=H: mute

MUTE=L: automatic mute



AUTOMATIC MUTE



5) SLEEP MODE

SLEEP data is H: clock and RAM stop to reduce circuit current (SLEEP mode)

L: normal operation

6) SYSTEM RESET

Automatically reset power-on. The reset time is about 120msec.

Delay time is set at 147.5msec.



3、Electrical Parameter

3.1、Absolute Maximum Ratings

(VCC=5V,f=1KHz,Vi=100mVrms,Ta=25℃)

Characteristic	Symbol	Conditions	Value	Unit
Power Supply Voltage	VDD	-	6.5	V
Supply Current	ICC	-	100	mA
Power Dissipation	Pd	-	650	mW
Operating Temperature	Topr	-	-40 to +85	℃
Storage Temperature	Tstg	-	-40 to +125	℃
Soldering Temperature	T _L	10s	260	℃

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage	VCC	-	4.5	5	5.5	V
Supply voltage	VDD	-	4.5	5	5.5	V
Difference voltage	VCC-VDD	-	-0.3	0	0.3	V
Clock frequency	fck	-	1	2	3	MHz
High input voltage	V _{IH}	-	0.7VDD	-	VDD	V
Low input voltage	V _{IL}	-	0	-	0.3VDD	V

3.3、Electrical Characteristics

(VCC=5V,f=1KHz,Vi=100mV_{RMS},Ta=25℃)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
I _{CC}	Circuit current	No signal	-	18.0	40.0	mA
G _v	Voltage gain	RL=47KΩ	-3.5	-0.5	2.5	dB
V _{omax}	Maximum output voltage	THD=10%	0.7	1	-	V _{RMS}
THD	Output distortion	30KHz LPF	fs=500KHz	-	0.3	%
			fs=250KHz	-	0.5	
No	Output noise voltage	DIN-AUDIO (fs=250KHz)	-	-92	-75	dBV
SVRR	Supply voltage rejection ratio	ΔVCC=-20 dBV,f=100Hz	-	-40	-25	dB
TMUTE	Mute time	Upon changing Delay Time	508	528	548	ms
		Upon canceling Sleep Mode	508	528	548	
ICCS	Circuit current (Sleep mode)	Sleep mode	-	14.0	30.0	mA

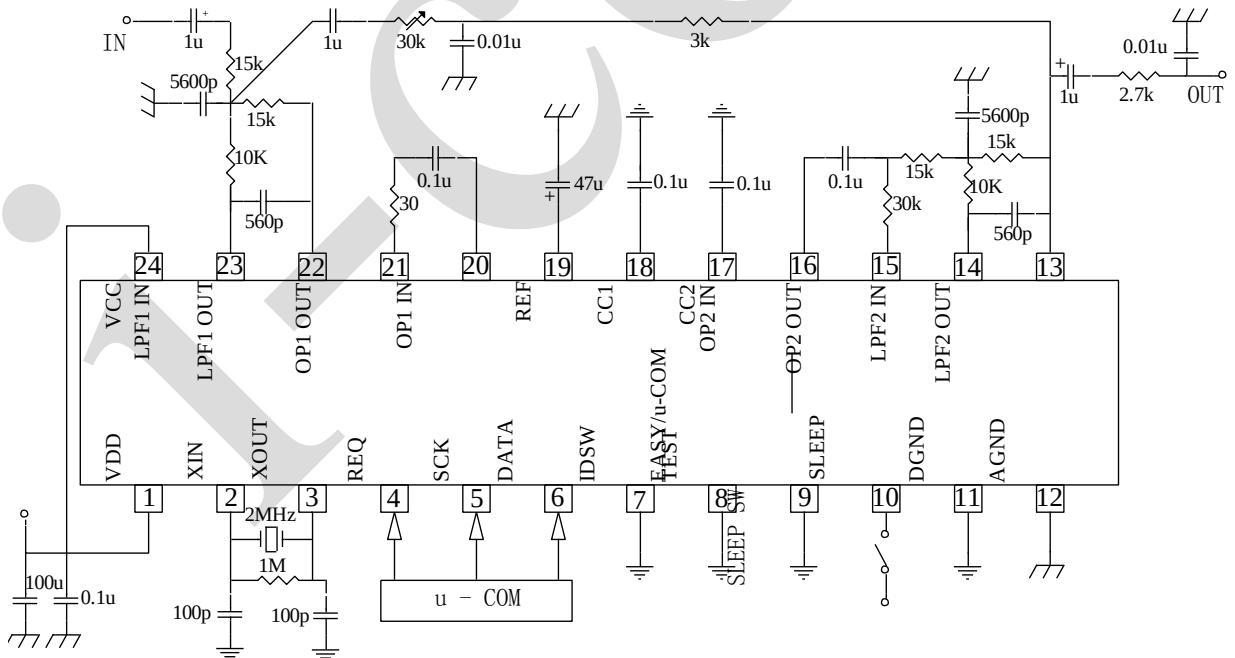


4.2、Test Methods

NO.	Parameter	Sampling frequency	Symbol	S4	S5	S6	S7	S10	S24	S30	Notes
1	Current circuit	-	I _{CC}	1	1	1	1	1	2	2	No signal
2	Voltage gain	500KHz	Gv1	*	*	*	1	1	1	1	-
		250KHz	Gv2	*	*	*	2	1	1	1	
3	Delay time	500KHz	Tda	1	1	1	1	1	1	1	cf 11-1)
			Tdb	2	1	1	1	↓	↓	↓	
			Tdc	1	2	1	1	↓	↓	↓	
			Tdd	2	2	1	1	↓	↓	↓	
			Tde	1	1	2	1	↓	↓	↓	
			Tdf	2	1	2	1	↓	↓	↓	
			Tdg	1	2	2	1	↓	↓	↓	
			Tdh	2	2	2	1	↓	↓	↓	
		250KHz	Tdi	1	1	1	2	↓	↓	↓	
			Tdj	2	1	1	2	↓	↓	↓	
			Tdk	1	2	1	2	↓	↓	↓	
			Tdl	2	2	1	2	↓	↓	↓	
			Tdm	1	1	2	2	↓	↓	↓	
			Tdn	2	1	2	2	↓	↓	↓	
			Tdo	1	2	2	2	↓	↓	↓	
			Tdp	2	2	2	2	1	1	1	
4	Output voltage (max)	500KHz	V _{max1}	*	*	*	1	1	1	1	30KHz L.P.F THD=10%
		250KHz	V _{max2}	*	*	*	2	1	1	1	
5	Total harmonic distortion	500KHz	THD1	*	*	*	1	1	1	1	30kHz L.P.F
		250KHz	THD2	*	*	*	2	1	1	1	
6	Output noise voltage	250KHz	No	*	*	*	2	1	1	1	DIN AUDIO V _i =0mV _{RMS}
7	Supply voltage rejection ratio	-	SVRR	*	*	*	*	1	1	2	ΔV _{CC} = -20 dBV f=100Hz
8	Mute time	-	Mute T	² ↓ ₁	*	*	*	1	1	1	Upon changing Delay Time
		-	Mute T	*	*	*	*	² ↓ ₁	1	1	Upon canceling Sleep Mode

Note* 1 or 2

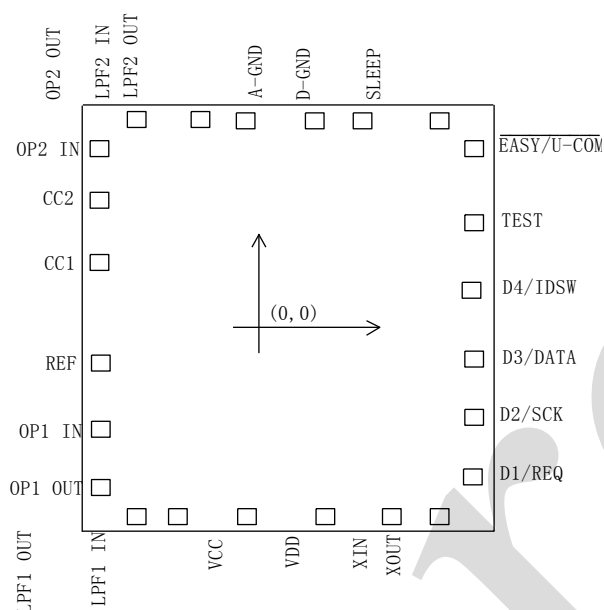
EASY MODE





6、Pad Diagram And Pad Location

6.1、Pad Diagram



6.2、Pad Location

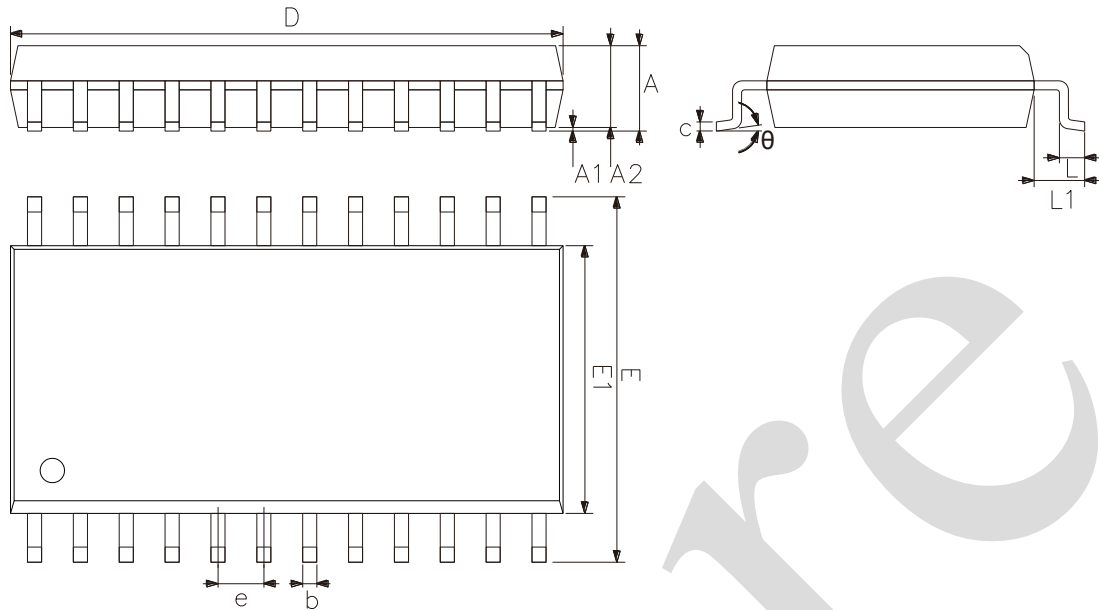
(UNIT: μm)

N0.	Name	X	Y
1	VDD	67	1201.8
2	XIN	67	916.6
3	XOUT	67	415.4
4	D1_REQ	267.05	67
5	D2_SCK	803.5	67
6	D3_DATA	1339.95	67
7	D4_IDSW	1876.4	67
8	TEST	2346.75	67
9	EASY/u-COM	2800.55	67
10	SLEEP	3323.25	455.9
11	DGND	3322.85	1186.5
12	AGND	3322.85	1624.5
13	LPF2OUT	3322.85	1974.8
14	LPF2IN	3322.85	2426.5
15	OP2OUT	3322.85	2796.35
16	OP2IN	2878	3120.25
17	CC2	2568.2	3120.25
18	CC1	2326.6	3120.25
19	REF	1175.55	3120.25
20	OP1IN	763.95	3120.25
21	OP1OUT	440.6	3120.25
22	LPF1OUT	67	2791.2
23	LPF1IN	67	2487.5
24	VCC	67	2211.2



7、Package Information

7.1、SOP24



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	2.35	2.65
A1	0.10	0.30
A2	2.13	2.44
b	0.39	0.47
c	0.25	0.30
D	15.19	15.55
E	10.10	10.57
E1	7.40	7.62
e	1.27	
L	0.41	1.00
L1	1.30	1.50
θ	0°	8°



8、Statements And Notes

8.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

8.2、Notes

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